

INTER-REGIONAL COMMUTING IN NORTHERN CALIFORNIA

January 1999

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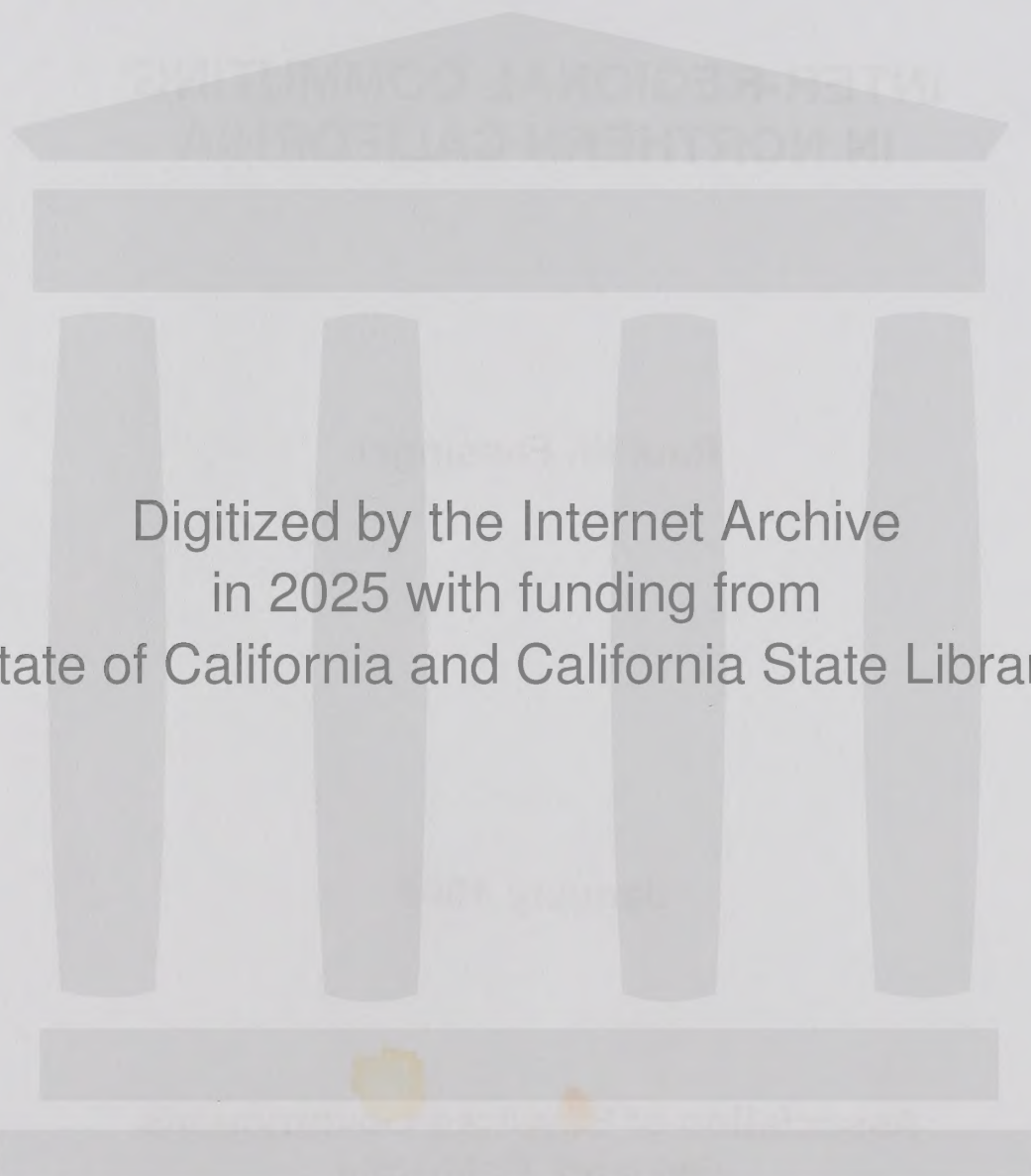
INTER-REGIONAL COMMUTING IN NORTHERN CALIFORNIA

Paul W. Fassinger

January 1999

**Association of Bay Area Governments
Oakland, California**

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Executive Summary

This report describes how commuting patterns have changed nationally and in Northern California, and provides a forecast of future commuting trends. This forecast is really an evaluation of work done by others, particularly the staff of the Metropolitan Transportation Commission (MTC). Because our expectations for inter-regional commuting will be included in future Association of Bay Area Governments' (ABAG) forecasts, and the levels of inter-regional commuting we set will be used by MTC in the future, it is important for ABAG to evaluate inter-regional commuting and describe our understanding of future trends. Additionally, this information can serve to inform the discussions of policymakers who are already addressing the impact of inter-regional commuting in Northern California.

National data show that over the last three decades, commuters are increasingly drawn from multi-worker households. Commuters travel longer distances, and primarily go from homes in suburban areas to jobs in suburban areas. We are also seeing more inter-regional commuting. The Bay Area mirrors these trends in many respects although our inter-regional commuting is not as significant as the national data show for the average metropolitan area. Perhaps the size and unique geography of the region have played a part in this difference.

We should not necessarily look at the existing population of the counties surrounding the Bay Area to assess the potential increase in the number of inter-regional commuters. In the past inter-regional commuters typically moved to outlying counties after they had already found employment in the Bay Area. Inter-regional commuters have been migrants from the Bay Area, or other parts of the country. We believe that this phenomenon will continue because of the relative cost of living in the various parts of Northern California and because of the suburbanization of jobs in the Bay Area.

MTC used the fratar technique to estimate the distribution of inter-regional commuters that were forecast in aggregate by ABAG. Fratar technique is strictly a mathematical method used to take the detailed commuting pattern in the beginning year and fit it to less detailed information forecasted for a future year. A pattern similar to the base year results in the future year. This technique produced a distribution that is generally reflective of the trends we expect to see. However, because MTC used population growth instead of the growth in labor force in its forecast, and because of the technique provided low estimates of reverse commutes, we would expect that the overall forecast of inter-regional commuting should be higher.

An inter-regional partnership has already identified a variety of ways to address inter-regional commuting. These ideas can be categorized as bringing jobs and housing physically closer together and establishing more sustainable methods of moving and connecting people between distant jobs and homes.

Introduction

This report serves two purposes. First, it describes how commuting patterns have changed nationally and in Northern California, and how these patterns are expected to change in the future. Commuting is becoming an increasingly important part of demographic and economic modeling for the San Francisco Bay Area. Therefore, it is important to accurately represent inter-regional commuting in our next round of forecasts. Second, policymakers are increasingly facing issues caused by inter-regional commuting. Inter-regional commuting influences transportation, land use and air quality planning. This document cannot hope to provide definitive answers to the issues surrounding commuting. However, it can show the likely trends, explore reasons commuters choose the location of their homes and workplaces and identify some basic issues for policy discussions.

Our forecast of commuting in Northern California is essentially an evaluation of other work. In particular, it looks at a recent forecast by MTC. It also describes how such information is incorporated into ABAG's modeling efforts. First, we describe some underlying assumptions. Second, we look at national commuting trends, which provide a context for regional trends. Third, we examine inter-regional commuting in Northern California, analyzing demographic information, historical commute flows and forecasts of future commuting.

1. Assumptions

In making our forecast, it is important to state some basic assumptions underlying the projected trends since policy changes in land use or transportation and economic trends, such as electronic commerce and labor force participation can affect the forecast. Therefore, it is important to recognize that our forecasts of both Bay Area population and employment and commuting in Northern California assume the continuation of existing land use and transportation policies. Current zoning and local general plans underlie the forecasts.

Widespread changes in the basic organization of companies and their workforce would have an impact on our forecasts. However, we do not expect that changes in telecommuting, four-day workweeks and electronic commerce will have a significant impact on commuting trends and forecasts. Although these trends are important and should be monitored, they are expected to grow at a slow rate.

It is also important to recognize that ABAG's forecast of population and employment are partially based on assumptions about the region's transportation system and reflect the impact of MTC's regional transportation plan. MTC's forecasts of transportation are, in turn, based on ABAG's population and employment estimates from an earlier iteration of the forecasting process. Thus, ABAG begins the process of updating its estimates and MTC follows with revised estimates of the transportation system. As a result, commuting forecasts will be profoundly affected by ABAG's forecasts of the Bay Area's future

population growth and employment, and will have the most important impact on this commuting forecast. We believe that the relatively low population and employment growth rates in our *Projections 98* forecast are very likely to be achieved. Forecasts for surrounding counties are more highly dependent on migration for population growth and, in turn, to support local job growth. However, to the extent that Bay Area employment draws commuters from surrounding regions, the commute levels we are forecasting appear to be reasonably conservative.

2. National Patterns of Commuting

To place Bay Area information in context, we reviewed studies of national commuting behavior, as well as academic work on the reasons commuters choose the location of their residences. It is generally agreed that commuters exhibit a variety of behaviors in response to the cost and time associated with commuting. People generally prefer a shorter commute.^{1, 2} However, many people are willing to trade commuting time for lower housing costs, better schools, safer streets, or some other characteristics of a particular community.^{3, 4, 5}

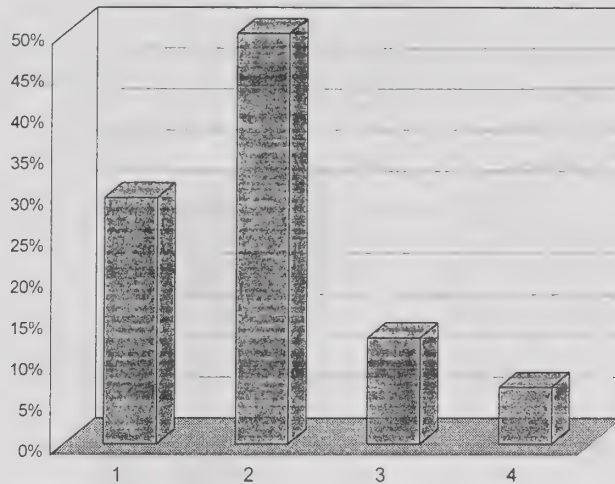
As the Bay Area and surrounding regions grow over time, the question becomes: how will commuting change in response to different employment opportunities, levels of roadway congestion and changes to local communities? We conclude that commuting from adjoining regions will continue to increase significantly for a number of years, and while the rate of growth will eventually decline, the absolute number of commuters will steadily increase until at least 2020. The reasons for these conclusions are partly found in national commuting data.⁶

In addition to information from the decennial census, significant sources of commuting data can be found in the Nationwide Personal Transportation Surveys (NPTS)^{7, 8} and the American Housing Survey (AHS).⁹ Several reports have summarized the information from these sources and they provide a clear picture of the changes in the nation's commuting behavior over time. These changes occurred most rapidly in the 1970s and 1980s.

Multiple-Worker Households

The 1980s saw a boom in the number of workers that was driven by the increase in the number of women in the labor force. As a result, the typical pattern for the nation changed from a single worker employed outside the home to two-worker households. Figure 1 illustrates the 1990 distribution of workers per household nationally. Multiple-worker households are now more common than single-worker households. About 50 percent of working households are two-worker households.

Figure 1
Workers Per Household



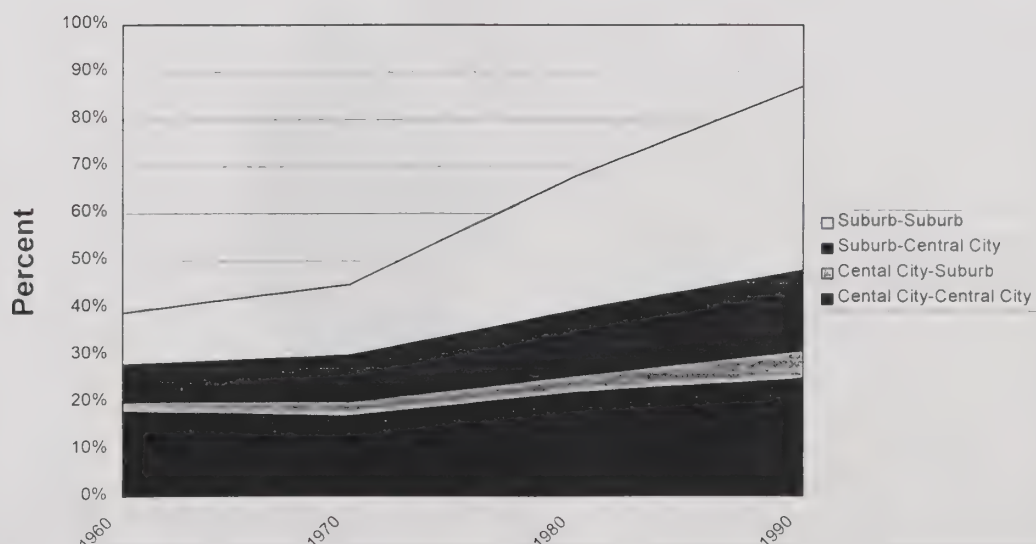
Source: Pisarski, Commuting in America II

By the 1990s, the boom in the number of workers began to diminish as demographic changes caused slower growth in the working age population and labor force. The rate of growth in women's labor force participation has been much more moderate in the 1990s. Additionally, growth in the number of people over 65 years of age resulted in higher proportions of retired workers.

Suburbanized Commuting

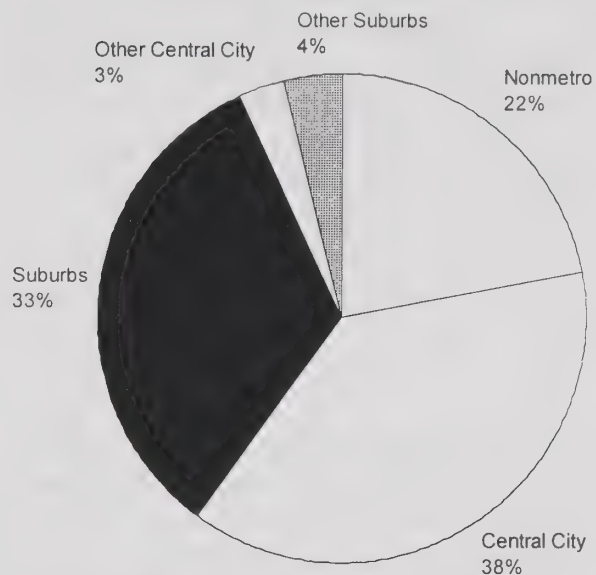
The second trend in commuting began in the 1970s with a shift from the central city as the primary work location to commuting between suburban homes and suburban places of employment. As workers increasingly moved from central cities to suburban areas, businesses opened in response to the shift in population, and many businesses relocated operations to lower cost suburban areas.

Figure 2
Growth Trend in Metropolitan Commuting Flows



Source: Pisarski, Commuting in America II

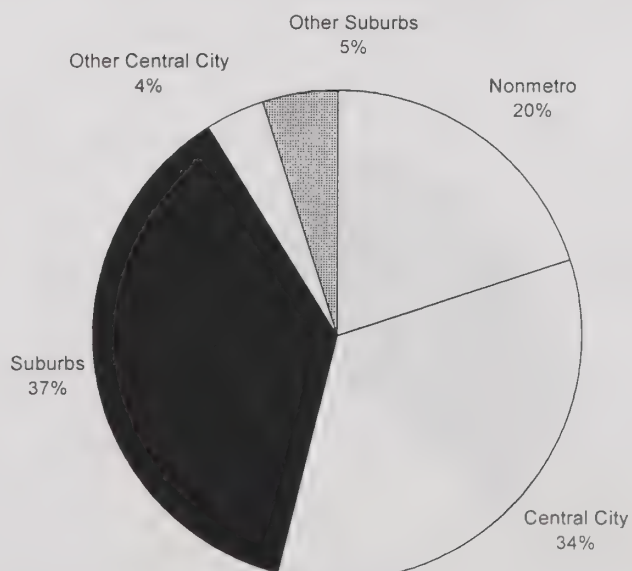
Figure 3 - U. S. Job Distribution 1980



Source: Pisarski, Commuting in America II

1990 data indicated that 50 percent of the nation's commuters lived in the suburbs, and over 41 percent of the jobs are located there. As Figure 2 indicates, suburb-to-suburb commuting accounted for 44 percent of all commuting in 1990 (up from only 10 percent in 1960).¹⁰ Suburban commuting became the largest category of commuting, exceeding the proportion of suburban residents commuting to central cities and urban residents commuting to central cities.

Figure 4 - U. S. Job Distribution 1990



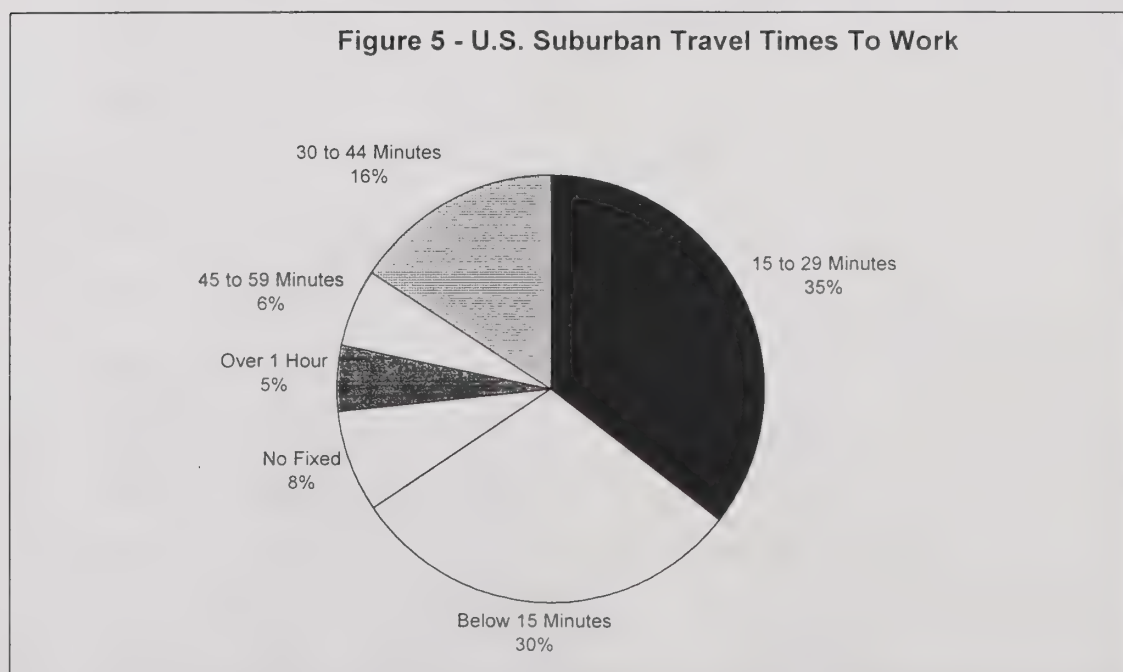
Source: Pisarski, Commuting in America II

Of particular importance to this report, commuting between metropolitan areas saw substantial growth between 1980 and 1990, most notably suburb-to-suburb commuting. While Figure 2 showed suburb-to-suburb commuting occurring inside a single metropolitan area, Figures 3 and 4 show commuting by people who live in one metropolitan area and work in a different metropolitan area.¹¹ These inter-regional commuters are designated as either commuters to "Other Center City" or "Other Suburb." In 1980, 7 percent of all jobs were located in areas classified as "Other Central City" and "Other Suburbs." In 1990, those external jobs increased to 9 percent. Although these jobs are a small portion of the total job distribution, this growing trend can help explain, in part, the inter-regional commuting phenomenon.

Length of Commuting Trips

With growth in suburban and inter-regional commuting, it is probably not surprising that the third trend we see in the national data is that commuters are traveling longer distances. Several factors have contributed to this trend. The most important factor causing increases in trip length is the shift of the population to larger metropolitan areas and their neighboring suburbs. Work trips, and other types of trips, by suburban residents are longer than comparable trips by central-city residents. While the length of suburban work trips has not increased appreciably over time, the shift of the population to suburban locations has caused an increase in the overall average. Interestingly, some types of work trips have increased in length. For example, the American Housing Survey indicates that central-city trips increased in length. The change in distance indicates that city dwellers are increasingly traveling to suburban job locations.

The average travel time for workers is roughly 20 minutes. Sixty-five percent of commuters have a one-way trip of 30 minutes or less.¹² Figure 5 shows that only 5 percent of suburban commuters travel more than one hour to work.¹³



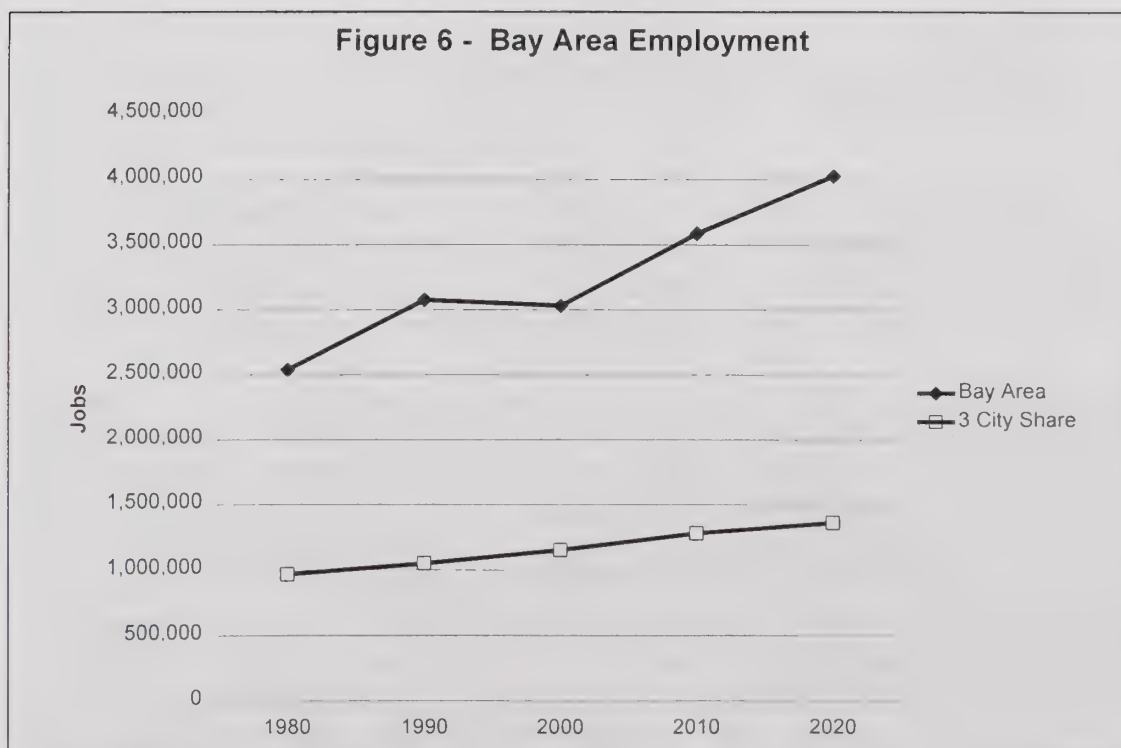
Source: Pisarski, Travel Behavior Issues in the 90's

While travel distances have increased, travel time has been more stable because of higher vehicle speeds (less congestion) in suburban areas. People have also shifted the time of day for their commute, in order to avoid peak traffic problems. Some analysts indicate that the shift of jobs toward the service sector allows the movement of work trips away from traditional peak trips.

3. Historic Northern California Commuting Patterns

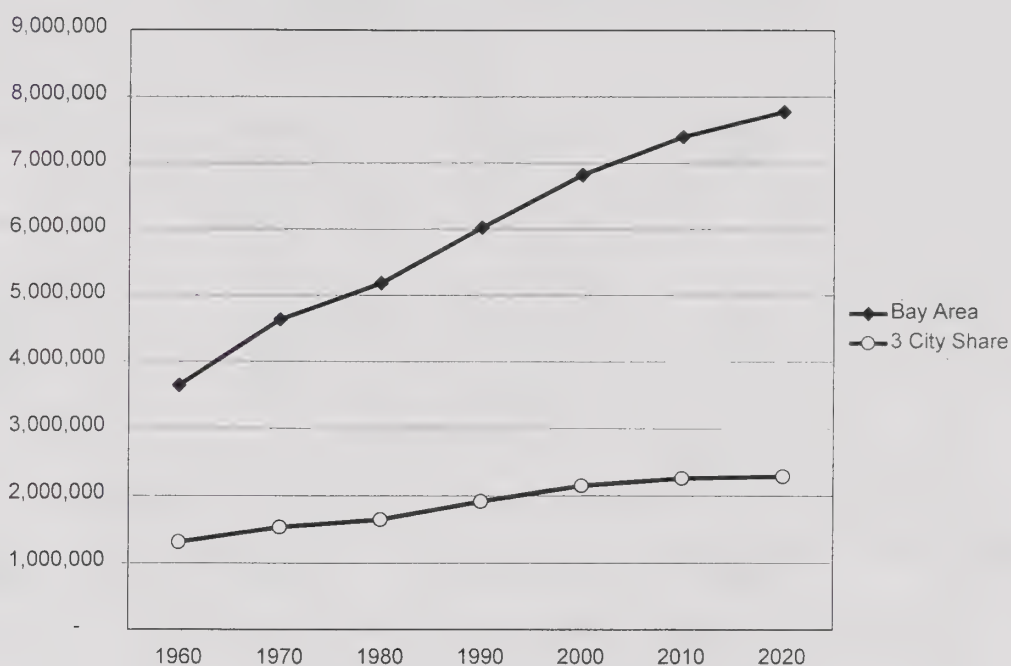
The demographic changes seen at the national level have also affected the Bay Area. The workforce has increased by over 30 percent during the 1970s, with growth becoming a more moderate during the 1980s. Women's labor force participation also increased during the 1970s and again, the trend became more moderate rising from 54.9 percent to 60.8 percent during the 1980s. Households in the Bay Area typically have 1.3 workers. Like the rest of the nation, we expect the Bay Area's labor force to grow much more slowly in the future. ABAG's forecast assumes continued increases in women's labor force participation and delays in retirement by older people. Even so, the growth in the Bay Area's labor force will decline from a rate of 2.3 percent annual growth during the 1980s, to less than 1 percent during the 1990s and for the foreseeable future.

While the Bay Area has also seen a suburbanization of population and jobs, there are still some important differences from the national trends. Figure 6 shows a relatively stable level of jobs in the three largest cities (San Jose, San Francisco and Oakland) compared to the employment growth. Oakland is only expected to add 30,000 jobs between 1995 and 2020, with San Francisco adding 145,000 and San Jose adding 175,000 jobs during



Source: ABAG *Projections* Series

Figure 7 - Bay Area Population



Source: ABAG *Projections* Series

the same time period. However, none of these central cities can compare to the job growth expected in suburban areas.

The population of the Bay Area is certainly shifting away from central cities and toward suburban areas. Figure 7 compares regional population growth to the population in the three largest cities. The figure illustrates that the total population of these three cities is not keeping pace with the region's growth.

While Oakland and San Francisco have exhibited the more typical urban pattern of peak population in 1950 and then a decline in population until 1980, San Jose has shown a pattern of continued population growth. We attribute this unique pattern to San Jose's recent transformation from a medium sized city into an urban center.

Commuting, particularly the Bay Area's inter-regional commuting, has seen significant growth between 1960 and 1990. Table 1 describes inter-regional commuting for the Bay Area and the surrounding regions of Northern California using data from the last four decennial censuses.¹⁴ The commute into and out of the Bay Area has grown over time, but the strongest growth has been into the Bay Area from surrounding regions. Commuters from other areas typically commute into the closest counties in the Bay Area. Commuters from the Association of Monterey Bay Area Governments (AMBAG)_region — Santa Cruz, Monterey and San Benito — typically commute into Santa Clara County. Commuting growth toward the Bay Area from San Joaquin and Stanislaus has been concentrated in Alameda, Santa Clara and Contra Costa Counties.

Table 1
Bay Area Employed Residents and Jobs

Location of Work	Residents 1960		Residents 1970		Residents 1980		Residents 1990	
Bay Area	1,309,695	99.7%	1,651,278	99.7%	2,454,231	92.6%	3,042,710	99.3%
San Joaquin	126	0.0%	142	0.0%	327	0.0%	815	0.0%
Stanislaus	207	0.0%	221	0.0%	530	0.0%	1,135	0.0%
SACOG	1,029	0.1%	1,503	0.1%	2,955	0.0%	7,086	0.2%
AMBAG	1,920	0.1%	1,954	0.1%	4,892	0.1%	9,829	0.3%
Other	648	0.0%	926	0.1%	1,132	0.2%	2,685	0.1%
Total	1,313,625		1,656,024		2,464,067		3,064,260	
Worker's Residence	Bay Area Jobs 1960		Bay Area Jobs 1970		Bay Area Jobs 1980		Bay Area Jobs 1990	
Bay Area	1,309,695	99.7%	1,651,278	99.3%	2,454,231	98.8%	3,042,710	97.6%
San Joaquin	303	0.0%	537	0.0%	993	0.0%	10,326	0.0%
Stanislaus	173	0.0%	550	0.0%	1,518	0.1%	4,129	0.1%
SACOG	1,776	0.1%	4,762	0.3%	17,676	0.7%	27,572	0.9%
AMBAG	1,283	0.1%	3,522	0.2%	5,839	0.2%	13,619	0.4%
Other	965	0.1%	1,887	0.1%	4,251	0.2%	20,310	0.7%
Total	1,314,195		1,662,536		2,484,508		3,118,666	

Source: U.S. Census REIS CD-ROM, "Journey to Work Data"

However, as a share of overall employment, this outward commute appears to be below the national average. By 1990, less than 3 percent of the region's jobs were held by workers living outside the Bay Area. Presumably this is because the Bay Area is a very large region where job centers have traditionally been located in the major cities and older suburbs that are adjacent to the Bay.

Table 2 shows that, overall, San Joaquin County has a net out-commute to the Bay Area. However, it has a net in-commute from Sacramento and Stanislaus Counties, as well as Merced County, which has been included in the other category. Unlike the Bay Area, inter-regional commuters make up a substantial portion of the San Joaquin workforce. In 1990, almost 12 percent of the employed residents in San Joaquin County worked in other regions. Over 10 percent of residents' jobs were in the Bay Area.

Table 2
San Joaquin County Journey to Work

Location of Work	Residents 1960		Residents 1970		Residents 1980		Residents 1990	
SAN JOAQUIN	76,237	96.6%	85,604	93.8%	123,118	92.4%	159,413	88.3%
BAY AREA	965	1.1%	1,887	1.9%	4,251	3.2%	20,310	10.6%
SACOG	998	1.2%	973	1.0%	1,712	1.3%	3,478	1.8%
AMBAG	0		0		0		0	
STANISLAUS	891	1.0%	1,275	1.3%	2,535	1.9%	5,147	2.7%
OTHER	837	1.0%	1,671	1.7%	1,343	1.0%	2,715	1.4%
TOTALS	79,928		91,410		132,959		191,063	

Worker's Residence	County Jobs 1960		County Jobs 1970		County Jobs 1980		County Jobs 1990	
SAN JOAQUIN	76,237	96.6%	85,604	93.8%	123,118	92.4%	159,413	88.3%
BAY AREA	648	0.8%	926	1.0%	1,132	0.8%	2,685	1.5%
SACOG	408	0.5%	1,336	1.5%	2,287	1.7%	5,398	3.0%
AMBAG	0		0		0		0	
STANISLAUS	1,360	1.7%	2,932	3.2%	4,430	3.3%	8,779	4.9%
OTHER	256	0.3%	423	0.5%	2,218	1.7%	4,320	2.4%
TOTALS	78,909		91,221		133,185		180,595	

Source: U.S. Census REIS CD-ROM, "Journey to Work Data"

Stanislaus is somewhat farther from the Bay Area, but still serves as a significant source of workers commuting into the region. In recent years communities have grown in the northern portion of the county which is more accessible to the Bay Area. Commuters to the Bay Area are typically going to jobs in Alameda, Contra Costa or Santa Clara Counties. Workers from the Bay Area commuting into Stanislaus have grown substantially in percentage terms, but the absolute numbers are actually very small (see Table 3).

The interchange of commuters with San Joaquin County is larger than the interaction with the Bay Area. However, workers commuting in and out of Stanislaus County and San Joaquin Counties are workers commuting to and from the "other" category, primarily Merced County. In total, the residents of Stanislaus working outside the county increased from 5.3 percent in 1960 to 15.7 percent in 1990. Workers from outside the county with jobs in Stanislaus increased from 4.2 percent in 1960 to 9.5 percent in 1990.

Table 3
Stanislaus County Journey to Work

Location of Work	Residents		Residents		Residents		Residents	
	1960		1970		1980		1990	
Stanislaus	45,031	94.7%	53,512	92.2%	92,902	91.8%	122,957	84.3%
Bay Area	303	0.6%	537	0.9%	993	1.0%	10,326	7.1%
AMBAG	-	0.0%	21	0.0%	42	0.0%	136	0.1%
SACOG	98	0.2%	137	0.2%	201	0.2%	389	0.3%
San Joaquin	1,360	2.9%	2,932	5.1%	4,430	4.4%	8,779	6.0%
Other	742	1.6%	907	1.6%	2,660	2.6%	3,355	2.3%
Total	47,534		58,046		101,228		145,942	
Worker's Residence	County Jobs		County Jobs		County Jobs		County Jobs	
	1960		1970		1980		1990	
Stanislaus	45,031	95.8%	53,512	94.6%	92,902	93.7%	122,957	90.5%
Bay Area	126	0.3%	142	0.3%	327	0.3%	815	0.6%
San Joaquin	891	1.9%	1,275	2.3%	2,535	2.6%	5,147	3.8%
AMBAG	4	0.0%	16	0.0%	-	0.0%	112	0.1%
SACOG	69	0.1%	-	0.0%	139	0.1%	339	0.2%
Other	896	1.9%	1,622	2.9%	3,193	3.2%	6,477	4.8%
Total	47,017		56,567		99,096		135,847	

Source: U.S. Census REIS CD-ROM, "Journey to Work Data"

The AMBAG region is comprised of Monterey, Santa Cruz and San Benito counties. It has a history of providing substantial numbers of workers to the Bay Area. Until fairly recently, the commute was over Highway 17 toward Saratoga and Mountain View. This commute primarily came from Santa Cruz County. However, in more recent years, an additional commute pattern has been growing from San Benito County into the southern portion of Santa Clara County.

As shown in Table 4, the percentage of workers commuting outside the AMBAG region has grown from 1.6 percent in 1960 to 9.4 percent in 1990. Almost all of those workers traveled to the Bay Area. The percentage of Bay Area workers traveling into the AMBAG region has also increased over time. Those workers held 0.9 percent of the AMBAG region's jobs in 1960, increasing to 2.6 percent in 1990. The growth in the number of incoming workers has shown a more moderate increase over time.

We might also note that the workforce in the AMBAG region, representing three counties, has a larger workforce (292,790 employed residents) than either San Joaquin (214,088 employed residents) or Stanislaus (145,942 employed residents) Counties.

Table 4
AMBAG Journey to Work

Location of Work	Residents 1960		Residents 1970		Residents 1980		Residents 1990	
AMBAG	107,982	98.4%	137,995	96.6%	201,951	91.9%	264,920	90.5%
BAYAREA	1,776	1.6%	4,762	3.3%	17,676	8.0%	27,572	9.4%
OTHER	16	0.0%	31	0.0%	-	0.0%	21	0.0%
SAN JOAQUIN	-	0.0%	-	0.0%	80	0.0%	46	0.0%
STANISLAUS	4	0.0%	16	0.0%	-	0.0%	112	0.0%
SACOG	-	0.0%	-	0.0%	125	0.1%	119	0.0%
Total	109,778		142,804		219,832		292,790	

Worker's Residence	Region's Jobs 1960		Region's Jobs 1970		Region's Jobs 1980		Region's Jobs 1990	
AMBAG	107,982	99.1%	137,995	98.9%	201,951	98.5%	264,920	97.2%
Bay Area	1,029	0.9%	1,503	1.1%	2,955	1.4%	7,086	2.6%
San Joaquin	-	0.0%	-	0.0%	17	0.0%	120	0.0%
Stanislaus	-	0.0%	21	0.0%	42	0.0%	136	0.0%
SACOG	-	0.0%	-	0.0%	62	0.0%	158	0.1%
Other	-	0.0%	22	0.0%	62	0.0%	141	0.1%
Total	109,011		139,541		205,089		272,561	

Source: U.S. Census REIS CD-ROM, "Journey to Work Data"

The Sacramento Council of Governments (SACOG) region — Sacramento, Yolo and Placer Counties — has not seen the same type of growth as experienced in the Bay Area and in the other regions that we have discussed. As shown in Table 5, the percentage of SACOG workers commuting to the Bay Area has increased from 0.6 percent in 1960 to 2.2 percent in 1990. Workers from the Bay Area held 0.9 percent of the SACOG region's jobs in 1960 and 1.6 percent of the jobs in 1990. Although there was growth, the lower level of interaction is presumably because it is located farther from the Bay Area's job centers. Commuting between SACOG and San Joaquin is also significant.

As a multi-county region, SACOG had almost 615,000 employed residents in 1990. This is close to the combined total of employed residents from the AMBAG, San Joaquin and Stanislaus regions. However, the small percentage of the SACOG workforce commuting to the Bay Area is comparable to the commuters from Stanislaus County alone.

The character of the SACOG area is significantly more industrial than the other areas surrounding the Bay Area. It also has a much larger percentage of jobs in the government and services sectors because of the state government in Sacramento and U.C. Davis.

Table 5
SACOG Journey to Work

Location of Work	Residents 1960		Residents 1970		Residents 1980		Residents 1990	
SACOG	219,236	99.2%	261,839	98.1%	417,491	98.0%	594,766	96.7%
BAY AREA	1,283	0.6%	3,522	1.3%	5,839	1.4%	13,619	2.2%
STANISLAUS	69	0.0%	-	0.0%	139	0.0%	339	0.1%
SAN JOAQUIN	408	0.2%	1,376	0.5%	2,491	0.6%	5,755	0.9%
AMBAG	-	0%	-	0%	62	0%	158	0%
Total	221,025		266,778		426,159		614,838	

Worker's Residence	Region's Jobs 1960		Region's Jobs 1970		Region's Jobs 1980		Region's Jobs 1990	
SACOG	219,236	98.6%	261,839	98.8%	417,491	98.3%	594,766	97.6%
Bay Area	1,920	0.9%	1,954	0.7%	4,957	1.2%	9,878	1.6%
Stanislaus	98	0.0%	137	0.1%	201	0.0%	389	0.1%
AMBAG	-	0.0%	-	0.0%	125	0.0%	119	0.0%
San Joaquin	998	0.4%	1,011	0.4%	1,800	0.4%	3,883	0.6%
Other	77	0.0%	60	0.0%	257	0.1%	560	0.1%
Total	222,329		265,001		424,831		609,595	

Source: U.S. Census REIS CD-ROM, "Journey to Work Data"

4. Commuting Attitudes and Behavior

In trying to assess the future behavior of commuters, it is important to look at the attitudes and characteristics that underlie the general trends. Commuters from other regions held 2.5 percent of the Bay Area's jobs in 1990, and ABAG's *Projections 98* forecast estimates they will hold 5.7 percent of all Bay Area jobs by 2020. Are there enough people willing to make such a commute? Will they have the appropriate skills to hold the jobs being forecast for the Bay Area? Will increased congestion or changes in the outlying communities result in significant changes in the commuting patterns that have developed between 1960 and 1990? Empirical evidence suggests that people are unwilling to devote (on average) more than 1 to 1.5 hours per day to travel.¹⁵

We believe that there will be a sufficient number of commuters because people will continue to migrate to the outlying regions. As we will discuss below, most of the current inter-regional commuters were drawn to the surrounding area by a combination of lower housing prices and other characteristics of those communities. Bay Area homes are on

average twice as expensive as homes in the Central Valley.¹⁶ For these reasons, we expect that significant migration will continue to occur. Given the attitudes and skills of the current population in the surrounding counties, we believe that migrants from places like the Bay Area will have the skills to hold the various types of jobs that we are forecasting for the future of the Bay Area.

To be sure, a large influx of migrants will result in significant changes to the outlying regions of Northern California. Those changes are already being felt, making these areas more desirable for some migrants, and less desirable for others. In any case, outlying areas should continue to have lower housing prices, less congestion and more of a “small town feel,” than much of the Bay Area.

While commute patterns have shown the ability to change over the last three decades, we expect that future commuting patterns will most closely mirror the 1990 census pattern and the change in commuting patterns between 1980 and 1990. Forecasts for the Bay Area indicate slower long-term job growth than the region has recently experienced, but between 2000 and 2020, the Bay Area is expected to add almost 1 million additional jobs. Employment is expected to increase in all industries except agriculture and mining. Additionally, the gap between jobs in the region and the number of employed residents is expected to grow from 67,000 in the year 2000, to 195,000 in the year 2020, despite ABAG's forecast of significant increases in labor force participation in the Bay Area.

Demographics of Inter-regional Commuters

A recent doctoral dissertation by Richard Lee provides some interesting demographic information about inter-regional commuters from the Central Valley.¹⁷ Prior to his work, it was difficult to describe these commuters, although there were strong general feelings about the types of groups they represent. “They come to the [Valley] searching for lower cost housing, a better lifestyle, other opportunities, but they work elsewhere...by anecdote they have young families, work as school teachers, fire fighters, factory foreman, technical draftsmen, personnel managers, executive secretaries, and in sales. Dual income families are typical...Valley wages are consistently below those of the Bay Area. The difference varies from a few percentage points to as much as 25 percent or more...by sector.”¹⁸

Lee drew data from the U.S. Census data and the California Statewide Travel Survey. He focused on Stanislaus County because corroborating data was superior, but the results appear to be representative of at least Central Valley commuters.¹⁹ He concluded that long distance inter-regional commuters from Stanislaus County into the Bay area were predominantly male, 77 percent compared to 57 percent of the Stanislaus County labor force as a whole. The typical head of household for this group “has a high school education, some college but no degree...Just over 13 percent have a college degree or more education.”²⁰ On the whole, Stanislaus County residents are generally more educated than others in their county of residence, but not as educated as Bay Area residents. An estimated 28 percent of Bay Area residents have at least a Bachelors degree.²¹

Occupations Are Varied

Differences also appear to exist between the occupations of commuters and those of the overall workforce. Table 6 shows a comparison by type of occupation for inter-regional commuters coming from Stanislaus County, people in Stanislaus County described as household heads and Bay Area household heads.²² Household heads are, like inter-regional commuters, typically the primary wage earners in the household. The inter-regional commuters disproportionately hold precision production and technical jobs. However, as members of the Bay Area workforce they are underrepresented in the Executive, Administrative Management category, the Professional/Specialist category and they Other Services category.

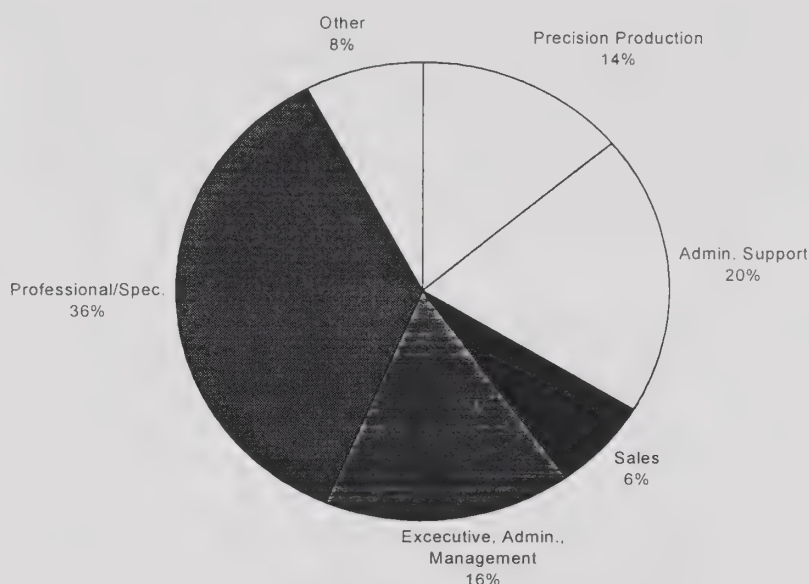
In line with the educational and occupation information, inter-regional commuters have a median household income of \$46,500, significantly higher than Stanislaus County as a whole at \$29,300. This was even higher than the Bay Area at \$41,600, apparently due to the higher number of multi-worker households. Approximately 93 percent of the inter-regional commuters were multi-worker households.²³

Table 6
Stanislaus Occupational Comparison

	Inter-regional Commuters	Other Stanislaus Household Heads	Bay Area Household Heads
Precision Production	30.4%	13.0%	10.0%
Admin. Support	6.5%	14.6%	17.0%
Sales	9.5%	11.9%	12.0%
Executive, Admin., Mgt.	9.2%	10.0%	16.1%
Machine Operator	8.2%	7.0%	4.2%
Professional/Spec.	8.8%	11.1%	17.0%
Technical	8.8%	2.8%	4.7%
Transportation Operative	7.2%	5.6%	2.8%
Protective Services	4.9%	1.5%	1.5%
Materials Handler	4.6%	4.9%	3.1%
Other Services	1.0%	10.8%	9.6%
Farming, Forestry Fisheries	1.0%	6.5%	1.4%
Private Household Services	0.0%	0.4%	0.5%

Source: Lee, Travel Demand and Transportation Policy

Figure 8
San Joaquin Commuter Occupations



Source: M.K. Elliot Marketing, Baseline Employment Profile for San Joaquin County Commuters

The San Joaquin County Partnership also conducted a survey to identify the occupations of commuters into the Bay Area.²⁴ It is not directly comparable with the data from Stanislaus County because of differences in survey populations, time periods, and categories. The San Joaquin Survey draws 2,200 respondents from the Commute Connection database and was administered in January 1997. However, it generally shows that a higher proportion of San Joaquin commuters held Precision Production and Administrative Support jobs than Bay Area workers did in 1990 (see Figure 8). While the Executive, Administrative, Management category is comparable between the two groups, the San Joaquin survey has an extraordinarily high percentage of workers in the Professional/Specialist category, possibly suggesting a different interpretation on the part of the respondents or analysts.

Demographic Changes

New immigrants to the Central Valley are changing the character of that region's population. Growth has included many migrants who have little if anything to do with agriculture, the traditional economic base of the County. New immigrant streams include retirees and workers relocating from other areas, Southeast Asians and Latinos from Mexico and Central America, who are increasingly moving from jobs in migratory agricultural labor into jobs in the manufacturing and service sectors.²⁵

Multi-worker Households

The Bay Area as a commuting region is already so large that the choice of housing inside the region is often determined by the location of different industries. While a home in the East Bay can provide access to electronics manufacturing jobs in Fremont and financial services jobs in San Francisco, most commuters find it an inappropriate location for jobs in Marin or southern Santa Clara Counties. Similarly, residents of Santa Clara County rarely work in San Francisco or Contra Costa County. However, the Bay Area has a very large and diverse economy that allows people to select almost any geographical combination of occupations and residencies.

Travel patterns in 1990 show San Joaquin residents commuting most frequently to Alameda, Santa Clara and Contra Costa Counties. Stanislaus residents commute primarily to Alameda and Santa Clara counties. More specifically, 54 percent of San Joaquin commuters to the Bay Area are traveling to jobs in southern Alameda County, the closest Bay Area location. About 41 percent of Stanislaus-based commuters are travelling to the same areas. AMBAG residents commute almost exclusively to Santa Clara County. The majority of SACOG commuters to the Bay Area travel to Solano County. In each case, the trend appears likely to persist through the year 2020.²⁶ We expect a continuation of the strong job growth already seen in the major commuting destinations of the Bay Area.

Multi-worker households have significantly increased in recent years, both nationally and in Northern California. With high housing costs and a national trend toward more limited retirement benefits, we expect growth in labor force participation, and multi-worker households to continue. Multi-worker households are important in the context of inter-regional commuting because housing in outlying areas provides a less effective location for households with workers traveling to multiple locations.

Multi-worker households are also likely to have one worker with a job located close to home. Essentially, one worker has the primary responsibility for household maintenance and family care. National travel patterns reflect significant differences between men and women. Women typically have jobs closer to home and are responsible for a larger share of travel for household errands.²⁷ As a result, households locating in outlying counties must be willing to trade factors like lower housing costs for one worker receiving lower wages. While the trend toward multi-worker families could be a limitation on inter-regional commuting, we think that the growth in Bay Area jobs near regional borders will allow the additional migrants to make the inter-regional commuting choice. Limitations on job choices are also a factor that is likely to maintain the differential in housing prices between outlying areas and locations in the Bay Area.

Attitudes of Inter-regional Commuters

Between July 21 and August 20, 1998, ABAG conducted a series of focus groups in Stockton, Modesto and Tracy.²⁸ Participants were commuters with jobs located in the Bay Area. The primary purpose of the groups was to determine why people choose to live

in the San Joaquin Valley when they work in the San Francisco Bay Area. This research provided additional support for the theory that interregional commuters are not a homogeneous group.²⁹

Research conducted by the Stanislaus County Economic Development Commission indicated that two-fifths of Modesto commuters and 85 percent of Patterson residents moved from the Bay Area. Supporting other studies, the majority of commuters cited the cost of housing as the main reason for moving to Stanislaus County. Just over half of Modesto area commuters and three-quarters of Patterson residents cited lower housing costs as the “most important reason.”

While the primary reason was the perception that housing prices in the Central Valley were significantly lower, jobs in the Bay Area paid significantly more. At least one participant indicated that wages in the Bay Area were high enough to compensate for the higher housing prices. Several participants indicated that their companies had wage structures that paid more to workers in major metropolitan areas.

While housing prices and wages are at the heart of commuters’ reasons for choosing long commutes, they do not tell the entire story. Millions of people are faced with the same choice, but choose to bear higher housing costs to live closer to work. The focus group participants had a wide variety of incomes and occupations. They chose longer and less common commutes than their peers. We might say that they are more sensitive to housing costs, but the focus group research indicates some other factors.

ABAG’s focus group participants had a variety of reasons for being inter-regional commuters. The factors respondents mentioned included safer communities, good schools and small-town atmosphere. In a related quality of life question, several respondents noted that a clean environment and money for the “extras” were also important. Several had chosen to keep a job that was relocated from the Central Valley to the Bay Area. Some had family ties in the Central Valley and were willing to commute a longer distance so that they or their spouse could be closer to their extended family.

In Patterson, one-fifth of all responders cited “small-town atmosphere.” Only 6 percent of Modesto respondents and only one person in Patterson stated that they chose the city because they were “born here.” The survey also asked respondent to rate their cities of residence with regard to “pleasant neighborhoods.” About one-quarter of all residents in both greater Modesto and Patterson rated their cities as excellent in this regard. Three-fifths of Modesto area residents rated their cities “good” while half of all Patterson commuters felt Patterson merited a good rating on neighborhood pleasantness. In the Modesto sample, 25 percent of households have two or more commuters; in Patterson, 43 percent of households have multiple commuters. Commuters in this context refer to other persons regularly working outside the home whether they work within or outside Stanislaus County.³⁰

5. Commuting Forecasts

MTC has recently produced a technical document that makes sketch estimates of inter-regional commuting between the Bay Area and the 12 neighboring counties.³¹ The pairing of residence and employment locations is based on the 1990 Census journey to work data. The forecast uses data on number of jobs and employed residents from ABAG's *Projections 98*, and MTC staff estimates based on the State of California Department of Finance's county-level population projections, and extrapolates commuting patterns. The "fratar" method proportionally scales 1990 commuting data until the patterns correspond to the year 2020 growth shown in ABAG's *Projections 98*. This section of the report summarizes and evaluates the results of that work.

MTC Commuting Forecast

Summaries of the commuting matrices produced by MTC in its report are presented in Tables 7-10.³²

Table 7 shows that San Joaquin County has a commuting pattern that changes over time from an outflow of about 1,290 (13,293 residents working outside the County minus 12,007 people working in the County) to an inflow of almost 10,000 during the 30-year period. The commute for more specific areas has a very different character. While the net commute into the Bay Area was almost 18,000 (20,276 residents working in the Bay Area minus 2,676 people working in the County) in 1990, that commute will increase to more than 71,000 net commuters coming into the Bay Area by 2020. Almost the entire change is in the direction of the Bay Area. Commuting from the Bay Area into San Joaquin County actually declines during this 30-year period.

Table 7
San Joaquin Inter-county Commuters

Live In	Work in San Joaquin			Work In	San Joaquin Residents		
	1990	2020	Change		1990	2020	Change
Bay Area	2,676	2,543	-5%	Bay Area	20,276	73,992	265%
AMBAG	126	58	-54%	AMBAG	445	273	-39%
Stanislaus	5,123	19,026	271%	Stanislaus	5,123	10,123	98%
SACOG	3,871	11,495	197%	SACOG	3,871	6,767	75%
Other	211	1,105	424%	Other	211	346	64%
Total	12,007	34,227	185%	Total	13,293	24,361	83%

Source: MTC Inter-regional Commute Estimates

Table 8
Stanislaus Inter-county Commuters

Live In	Work in Stanislaus			Work In	Stanislaus Residents		
	1990	2020	Change		1990	2020	Change
San Joaquin	5,123	10,123	98%	San Joaquin	8,763	9,026	117%
Bay Area	805	806	0%	Bay Area	10,326	43,036	317%
AMBAG	112	165	47%	AMBAG	153	401	162%
SACOG	358	748	109%	SACOG	389	771	98%
Other	6,483	19,656	203%	Other	3,365	5,415	61%
Total	12,881	31,498	145%	Total	22,996	68,649	199%

Source: MTC Inter-regional Commute Estimates

Table 8 shows MTC's forecast of Stanislaus County commuting. Not only will commuting continue to increase toward the Bay Area, but substantial growth is expected in commuting into San Joaquin County. At the same time, commuting from San Joaquin County into Stanislaus County is expected to grow, and from the Other category, particularly Merced County.

A similar picture is drawn for the SACOG region (Sacramento, Yolo and Placer Counties). As Table 9 shows, there is little or no growth in commuters coming from the Bay Area, but growth in commuters from outlying areas like San Joaquin and Stanislaus Counties. The SACOG region does provide a sharply increasing number of commuters going into other counties. Primarily, commuters are going to the Bay Area, but there are also significant increases to places like San Joaquin.

Table 9
SACOG Inter-regional Commuters

Live In	Work in SACOG			Work In	SACOG Residents		
	1990	2020	Change		1990	2020	Change
Bay Area	9,870	10,031	2%	Bay Area	13,523	46,917	247%
AMBAG	129	166	29%	AMBAG	193	457	137%
San Joaquin	3,871	6,767	75%	San Joaquin	5,730	11,495	101%
Stanislaus	389	771	98%	Stanislaus	358	748	109%
Other	567	2,102	271%	Other	228	233	2%
Total	14,826	19,837	34%	Total	20,032	59,850	199%

Source: MTC Inter-regional Commute Estimates

Table 10
AMBAG Inter-regional Commuters

Live In	Work in AMBAG			Work In	AMBAG Residents		
	1990	2020	Change		1990	2020	Change
Bay Area	7,069	6,511	-8%	Bay Area	27,524	67,246	144%
San Joaquin	126	273	117%	San Joaquin	46	58	26%
Stanislaus	153	401	162%	Stanislaus	112	165	47%
SACOG	193	457	137%	SACOG	39	166	326%
Other	159	582	266%	Other	75	98	31%
Total	8,200	8,224	0%	Total	28,854	70,121	143%

Source: MTC Inter-regional Commute Estimates

The AMBAG region (Santa Cruz, Monterey and San Benito) has the smallest number of commuter exchange with surrounding areas. MTC's forecast shows that the total number of commuters going into the AMBAG region is almost constant. Although commuters coming from the Bay Area are increasingly replaced by commuters from other regions. Given the size of the region, AMBAG supplies an extraordinary number of commuters to the Bay Area over time.

Overall, MTC's forecast indicates commuting from San Joaquin County into the Bay Area is expected to increase by 265 percent between 1990 and 2020, from approximately 20,300 to almost 74,000 commuters. Stanislaus County commuting into the Bay Area is expected to grow by 317 percent, from about 10,300 to approximately 43,000 commuters during the same time period. Inter-regional commuting for the SACOG area is expected to more than double, while the AMBAG area is expected to grow at 1.5 times the 1990 level. At the same time, MTC shows stable or declining levels of commuting coming from the Bay Area into the Central Valley. It also tends to support a large and growing commuting pattern between San Joaquin and the Bay Area where San Joaquin primarily serves as the home to workers employed in the Bay Area.

MTC's forecast is particularly good because it divides the Bay Area into 34 different locations, and therefore considers the movement of jobs toward more suburban areas, and the substantial growth of jobs in Santa Clara County, the Tri-Valley and Fremont. . This is important since Santa Clara County is expected to add 217,000 jobs between the years 2000 and 2020. Alameda County is expected to add over 200,000 jobs over the same period, with job growth concentrated in Dublin, Pleasanton, Livermore and Fremont. In both Counties, there is a widening gap between jobs and employed residents, and since Alameda County has traditionally housed large numbers of workers commuting into San Francisco, the effective gap is even larger.

As a purely mathematical extrapolation, the fratar method does not look at commuters' attitudes or the transportation system itself. While the results are generally reasonable, the amount of reverse commuting appears to be particularly low, as MTC's staff notes in its report.

ABAG's Adjusted Commuting Forecast

Population and employment forecasts are actually the basis for commuting behavior as outlined by MTC. ABAG's ***Projections 98*** forecast provides data on the growth in the Bay Area's employed residents and jobs over the next 20 years. The difference between employed residents and jobs is a rough approximation of the number of commuters arriving from outlying areas.

ABAG's expectations of job growth in Northern California are generally in line with the figures used by MTC in its work. MTC used ABAG's forecast for the Bay Area, and its forecast of jobs for surrounding areas is generally in line with other region's forecasts, although MTC's forecast may be too conservative. In some cases, ABAG staff consultants for those regions in estimating future population and job growth. The Bay Area is expected to see steady job growth over the period 2000 to 2020. Job growth in the surrounding areas is expected to increase more rapidly, in percentage terms, than in the Bay Area, although the majority of Northern California jobs is expected to be located in this region.

Future population growth in the Bay Area is expected to be much slower than previous time periods. As the average age of the Bay Area population increases, there will be fewer women in the "child bearing" years. Additionally, international migration will become an increasingly smaller percentage of the region's population and overall birth rates will begin to decline. As a result, we expect employment to grow faster than the population. Percentage population growth in surrounding counties will increase at more than twice the rate of Bay Area population.

However, overall population growth is not actually most important. As the population ages, we are also seeing higher numbers of people in the age groups that provide the most workers. Those in the 25-year old to 64-year old age groups, particularly 35 to 44-year olds, have the highest levels of labor force participation. The differences between population and job growth rates have also prompted us to project increased labor force participation over time, particularly among older age groups. Changes in retirement benefits and the cost of living indicate that this forecast is supported by national trends. As these trends effect populations generally, we expect to see similar trends in populations across Northern California. The result is that more of the labor force and more of the jobs will be located in outlying areas, than MTC assumed in its forecast.

Using California Department of Finance population forecasts we looked at labor force estimates for surrounding counties.³³ Table 11 shows labor force by county for the population over 16 years of age, and assuming growth in labor force participation at half the rate of the Bay Area. The result is 10 percent more workers located in these counties.

or additional 250,000 workers. MTC's analysis seems to underestimate all of the areas in about the same proportion.

By implication, the number of jobs in the surrounding counties is also higher. Our work on employment forecasting in a number of these areas tends to confirm that conclusion. The resulting impact on commuting patterns, using the type of method employed by MTC, is that we would see higher levels of commuting into, and out-of the Bay Area, but primarily more people living and working in adjoining regions. So that, while the fratar technique already appears to be under forecasting the reverse commute from the Bay Area, labor force changes are an additional reason that the reverse commute should be higher. Since the forecasted commuting patterns are based on ABAG's estimate of net commuting, a larger reverse commute would have to be offset with a larger in commute.

For the purposes of ABAG's Projections 2000, net inter-regional commuting is likely to grow. While we have not begun the modeling process, recent data suggest that our projections of Bay Area jobs for the year 2000 are likely to be low, while population numbers are still in line. Unless future growth rates for the Bay Area economy are lowered, even more Bay Area jobs will be filled by residents of the surrounding counties.

Table 11
Employed Residents Forecast Using Labor Force Estimates

	2000	2005	2010	2015	2020
San Joaquin	267,691	309,490	351,821	395,381	439,767
Stanislaus	228,289	280,744	335,095	366,534	399,513
Yolo	97,092	112,052	127,188	142,524	158,114
Placer	119,211	136,938	154,871	173,485	192,517
Sacramento	601,336	677,788	755,111	828,788	903,833
Santa Cruz	153,121	164,859	176,652	187,657	198,829
Monterey	186,884	210,489	234,367	257,540	281,108
San Benito	29,080	34,291	39,559	44,993	50,511
Total	1,682,703	1,926,651	2,174,665	2,396,901	2,624,192
MTC Estimate	1,570,600	1,765,800	1,961,000	2,167,400	2,373,800
Difference	112,103	160,851	213,665	229,501	250,392
	7.1%	9.1%	10.9%	10.6%	10.5%

Source: ABAG

6. Conclusions

Inter-regional commuters in Northern California are primarily concerned with housing prices, but there are other important factors like multiple job households and the characteristics of local communities that determine their choices. Those characteristics may include a safer, small-town environment, better schools for children, or proximity to friends and relatives.

Future growth in inter-regional commuting does not appear to be limited by the attitudes of existing commuters. We expect much of the growth in inter-regional commuting to be a result of new migrants to the surrounding region commuting into the Bay Area. The inter-regional commute of the Bay Area appears to be low in relation to other regions across the nation. The growth of job opportunities in areas closer to the borders of the Bay Area will also improve the accessibility of jobs to inter-regional commuters. In all likelihood, we will continue to see a segmentation of commuting from external areas to destinations inside the Bay Area, such that commuting from the Central Valley will focus on Alameda and Contra Costa County because the commute to Santa Clara County will become increasingly time consuming, while commuters from south of the Bay Area will provide commuters to Santa Clara County jobs.

The result of these trends is seen by some as a mismatch in the location of jobs and housing.³⁴ In addition to demographic forces like the two wage earner household, job turnover can also lead to commuting substantial distances from home, although non-demographic forces certainly play a role. Public policy that results in fiscal or exclusionary zoning is thought to be one factor. Moratoriums on growth also limit the ability of workers to move closer to their places of employment. Of course, the mismatch between workers' earnings and the cost of housing also plays an important role.

However, we should recognize that there is a diversity of viewpoints about the location of workers and jobs, and the desirability of development. With significantly higher unemployment rates and a job base that includes fewer jobs in growing high technology industries, regions like the Central Valley may have a different view of residential development than academics or Bay Area policymakers.

“Residential development is not viewed as a fiscal drain to the same degree as in the Bay Area; this is because new home prices in the Central Valley have been growing more expensive...and are generally more expensive than the existing housing stock.³⁵ Furthermore, new Valley housing can be saddled with a full array of special taxes and impact fees to ensure that it pays its way and still be considered affordable by Bay Area emigrants. Thus it appears that housing in the price range of many Bay emigrants is capable of carrying its own weight in terms of paying for infrastructure and public services to a greater degree in the Valley than would similarly priced housing closer to the Bay...Many Valley political leaders also view residential development in the San Joaquin Valley as a prelude to more lucrative employment projects.”³⁶

As one report described the phenomenon: “once urban in-migrants fill the new subdivision, Stanislaus County will attract white collar and highly skilled employees.” From the employees’ perspective “workers will ‘trade-off’ higher wages for a better quality of life and look for a job nearer to their new place of residence.”³⁷

New towns have the potential for appropriate design, and in the Central Valley, some of these developments are located closer to inter-regional commute destinations than many of the existing cities. While researches have questioned the potential for these new cities to simultaneously attract long distance commuters and high quality employment, they have the theoretical potential to contribute to a solution.

Changes in the character of people’s work would have a significant impact on inter-regional commuting, but it does not appear to be a key factor in our region. For example, production workers cannot usually work at home. A variety of attitudinal issues also limit the growth of telecommuting. Many people prefer to keep a physical separation between their place of work and their home, even groups like computer professionals, where telecommuting seems most likely.³⁸ Experimental Neighborhood Work Centers in the Bay Area and Modesto were discontinued in 1994 because of a lack of interest and in favor of working at home.³⁹ Generally, telecommuting is an option that is currently chosen by about 2 percent of U.S. workers.⁴⁰

The data seem to indicate that there is more potential in alternative work schedules. We have already noted the continued changes to commuting times and the potential of service industry employment to allow more diverse schedules. But in any case, the various motivations underlying commuters choices would indicate that a number of initiatives will have to contribute to an overall solution.

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²⁵ Lee, Richard, 1995, p.203

²⁶ C.L. Purvis, Detailed Inter-regional Commute Characteristics, Working Paper #8, Metropolitan Transportation Commission, Oakland, CA. May 1994

²⁷ Hanson, Susan, and G. Pratt. 1988 "Reconceptualizing the Links Between Home and Work in Urban Geography." Economic Geography 64, 4: 299-321

²⁸ Lee, Richard, 1995 p.146

²⁹ J. D. Franz, ABAG Focus Groups on Housing Choice, Association of Bay Area Governments, September 2, 1998, Oakland CA

³⁰ Lee, Richard, 1995 pp. 148-150

³¹ Planning Section, Travel Forecasts for the San Francisco Bay Area 1990-2020 Trip Generation and Trip Distribution, Metropolitan Transportation Commission, August 1998, Oakland, CA

³² 1990 numbers in this table and subsequent tables in this section differ from earlier tables because they were taken from STP-214 Census data, a more detailed data set than the typical Journey to Work Data used earlier. The universe of commute destinations and starting points is limited to Northern California. Chuck Purvis, RTP98 Inter-regional Commute Estimates 1990-2020 (46 District Fratar), MTC Memo, January 27, 1998

³³ Projections of Total Population of California Counties, California State Department of Finance, Report 93 P-3, May 1993, Sacramento CA.

³⁴ Cervero,R., "Jobs-Housing Balance and Regional Mobility" Journal of the American Planning Association, Vol.55, No.2, Spring 1989 pp.136-150

³⁵ SCEDCO, 1993

³⁶ Lee, Richard, 1995, pp.201-202

³⁷ Kreines and Kreines, 1989

³⁸ Lee, Richard, 1995 p. 225

³⁹ Lee, Richard, 1995 p.225

⁴⁰ Handy and Mohktarian, 1995

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